

Release notes for ENDF/B Development n-100_Fm_255
evaluation



April 26, 2017

- fudge-4.0 Warnings:

1. Cross section does not match sum of linked reaction cross sections
crossSectionSum label 0: total (Error # 0): CS Sum.

WARNING: Cross section does not match sum of linked reaction cross sections! Max diff: 0.35%

2. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 1 (n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] + gamma [total fission] [nubar]): / Form 'eval': (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

3. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 3 (total): / Form 'eval': / Component 0 (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

4. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 3 (total): / Form 'eval': / Component 1 (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

5. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 4 (n + Fm255): / Form 'eval': / Component 0 (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

6. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 4 (n + Fm255): / Form 'eval': / Component 1 (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

7. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 8 (n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] + gamma [total fission]): / Form 'eval': / Component 0 (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

8. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 8 (n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] + gamma [total fission]): / Form 'eval': / Component 1 (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

9. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 10 ($n + (Fm255_e1 \rightarrow Fm255 + \gamma)$): / Form 'eval': (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (4.499241e-10) is too small

10. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 11 ($n + (Fm255_e2 \rightarrow Fm255 + \gamma)$): / Form 'eval': (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (7.422041e-10) is too small

11. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 13 ($n + (Fm255_e4 \rightarrow Fm255 + \gamma)$): / Form 'eval': (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (1.478078e-09) is too small

12. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 14 ($n + (Fm255_e5 \rightarrow Fm255 + \gamma)$): / Form 'eval': (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (4.722196e-09) is too small

13. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 15 ($n + (Fm255_e6 \rightarrow Fm255 + \gamma)$): / Form 'eval': (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (1.164137e-09) is too small

14. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 16 ($n + (Fm255_e7 \rightarrow Fm255 + \gamma)$): / Form 'eval': (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (4.921533e-10) is too small

15. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 17 ($n + (Fm255_c \rightarrow Fm255 + \gamma)$): / Form 'eval': (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

16. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 18 ($Fm256 + \gamma$): / Form 'eval': / Component 0 (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

17. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 18 (Fm256 + gamma): / Form 'eval': / Component 1 (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

18. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 19 (n + Fm255 [angular distribution]): / Form 'eval': (Error # 1): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

19. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 20 (n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] + gamma [total fission] [spectrum]): / Form 'eval': (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

20. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 21 (n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] + gamma [total fission] [spectrum]): / Form 'eval': (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

21. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 22 (n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] + gamma [total fission] [spectrum]): / Form 'eval': (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

22. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 23 (n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'6 delayed'] + gamma [total fission] [spectrum]): / Form 'eval': (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

- **fudge-4.0 Errors:**

1. Duplicate Eout in outgoing distribution

Reading ENDF file: ../n-100_Fm_255.endf (Error # 0): Bad Eout

WARNING: skipping duplicate e_out = 6384470.0, ii = 121 6 10.0

WARNING: skipping duplicate e_out = 6384480.0, ii = 121 7 20.0

WARNING: skipping duplicate e_out = 6384490.0, ii = 121 8 30.0

WARNING: skipping duplicate e_out = 6384510.0, ii = 121 9 50.0

... plus 2 more instances of this message

2. Energy range of data set does not match cross section range
reaction label 8: n + (Fm255_c -> Fm255 + gamma) / Product: Fm255_c / Decay product: gamma_a / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (500000.0 -> 20000000.0) vs (110872.0 -> 20000000.0)
3. Energy range of data set does not match cross section range
reaction label 8: n + (Fm255_c -> Fm255 + gamma) / Product: Fm255_c / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (500000.0 -> 20000000.0) vs (110872.0 -> 20000000.0)
WARNING: Domain doesn't match the cross section domain: (165652.0 -> 20000000.0) vs (110872.0 -> 20000000.0)
WARNING: Domain doesn't match the cross section domain: (400000.0 -> 20000000.0) vs (110872.0 -> 20000000.0)
WARNING: Domain doesn't match the cross section domain: (238941.0 -> 20000000.0) vs (110872.0 -> 20000000.0)
... plus 3 more instances of this message
4. Energy range of data set does not match cross section range
reaction label 8: n + (Fm255_c -> Fm255 + gamma) / Product: Fm255_c / Decay product: gamma_b / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (165652.0 -> 20000000.0) vs (110872.0 -> 20000000.0)
5. Energy range of data set does not match cross section range
reaction label 8: n + (Fm255_c -> Fm255 + gamma) / Product: Fm255_c / Decay product: gamma_c / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (400000.0 -> 20000000.0) vs (110872.0 -> 20000000.0)
6. Energy range of data set does not match cross section range
reaction label 8: n + (Fm255_c -> Fm255 + gamma) / Product: Fm255_c / Decay product: gamma_d / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (238941.0 -> 20000000.0) vs (110872.0 -> 20000000.0)
7. Energy range of data set does not match cross section range
reaction label 8: n + (Fm255_c -> Fm255 + gamma) / Product: Fm255_c / Decay product: gamma_e / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (273076.0 -> 20000000.0) vs (110872.0 -> 20000000.0)
8. Energy range of data set does not match cross section range
reaction label 8: n + (Fm255_c -> Fm255 + gamma) / Product: Fm255_c / Decay product: gamma_f / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (200000.0 -> 20000000.0) vs (110872.0 -> 20000000.0)
9. Energy range of data set does not match cross section range
reaction label 8: n + (Fm255_c -> Fm255 + gamma) / Product: Fm255_c / Decay product: gamma_g / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (400000.0 -> 20000000.0) vs (110872.0 -> 20000000.0)
10. Calculated and tabulated Q values disagree.
reaction label 9: n[multiplicity:'2'] + Fm254 + gamma (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -4816392.443359375 eV vs -5176250. eV!

11. Energy range of data set does not match cross section range
reaction label 9: n[multiplicity:'2'] + Fm254 + gamma / Product: gamma_a / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (5500000.0 -> 20000000.0) vs (5196720.0 -> 20000000.0)

12. Energy range of data set does not match cross section range
reaction label 9: n[multiplicity:'2'] + Fm254 + gamma / Product: gamma_a / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (5500000.0 -> 20000000.0) vs (5196720.0 -> 20000000.0)

13. Energy range of data set does not match cross section range
reaction label 9: n[multiplicity:'2'] + Fm254 + gamma / Product: gamma_b / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (5500000.0 -> 20000000.0) vs (5196720.0 -> 20000000.0)

14. Energy range of data set does not match cross section range
reaction label 9: n[multiplicity:'2'] + Fm254 + gamma / Product: gamma_b / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (5500000.0 -> 20000000.0) vs (5196720.0 -> 20000000.0)

15. Calculated and tabulated Q values disagree.
reaction label 10: n[multiplicity:'3'] + Fm253 + gamma (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -11333061.21231079 eV vs -1.16929e7 eV!

16. Energy range of data set does not match cross section range
reaction label 10: n[multiplicity:'3'] + Fm253 + gamma / Product: gamma_a / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (12500000.0 -> 20000000.0) vs (11739200.0 -> 20000000.0)

17. Energy range of data set does not match cross section range
reaction label 10: n[multiplicity:'3'] + Fm253 + gamma / Product: gamma_a / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (12500000.0 -> 20000000.0) vs (11739200.0 -> 20000000.0)

18. Energy range of data set does not match cross section range
reaction label 10: n[multiplicity:'3'] + Fm253 + gamma / Product: gamma_b / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (12500000.0 -> 20000000.0) vs (11739200.0 -> 20000000.0)

19. Energy range of data set does not match cross section range
reaction label 10: n[multiplicity:'3'] + Fm253 + gamma / Product: gamma_b / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (12500000.0 -> 20000000.0) vs (11739200.0 -> 20000000.0)

20. Energy range of data set does not match cross section range
reaction label 10: n[multiplicity:'3'] + Fm253 + gamma / Product: gamma_c / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (12500000.0 -> 20000000.0) vs (11739200.0 -> 20000000.0)

21. Energy range of data set does not match cross section range
reaction label 10: n[multiplicity:'3'] + Fm253 + gamma / Product: gamma_c / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (12500000.0 -> 20000000.0) vs (11739200.0 -> 20000000.0)

22. Energy range of data set does not match cross section range
reaction label 10: n[multiplicity:'3'] + Fm253 + gamma / Product: gamma_d / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (12500000.0 -> 20000000.0) vs (11739200.0 -> 20000000.0)

23. Energy range of data set does not match cross section range
reaction label 10: n[multiplicity:'3'] + Fm253 + gamma / Product: gamma_d / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (12500000.0 -> 20000000.0) vs (11739200.0 -> 20000000.0)

24. Energy range of data set does not match cross section range
reaction label 10: n[multiplicity:'3'] + Fm253 + gamma / Product: gamma_e / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (12500000.0 -> 20000000.0) vs (11739200.0 -> 20000000.0)

25. Energy range of data set does not match cross section range
reaction label 10: n[multiplicity:'3'] + Fm253 + gamma / Product: gamma_e / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (12500000.0 -> 20000000.0) vs (11739200.0 -> 20000000.0)

26. Energy range of data set does not match cross section range
reaction label 10: n[multiplicity:'3'] + Fm253 + gamma / Product: gamma_f / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (12500000.0 -> 20000000.0) vs (11739200.0 -> 20000000.0)

27. Energy range of data set does not match cross section range
reaction label 10: n[multiplicity:'3'] + Fm253 + gamma / Product: gamma_f / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (12500000.0 -> 20000000.0) vs (11739200.0 -> 20000000.0)

28. Energy range of data set does not match cross section range
reaction label 10: n[multiplicity:'3'] + Fm253 + gamma / Product: gamma_g / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (12500000.0 -> 20000000.0) vs (11739200.0 -> 20000000.0)

29. Energy range of data set does not match cross section range
reaction label 10: n[multiplicity:'3'] + Fm253 + gamma / Product: gamma_g / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)
- WARNING: Domain doesn't match the cross section domain: (12500000.0 -> 20000000.0) vs (11739200.0 -> 20000000.0)
30. Calculated and tabulated Q values disagree.
reaction label 11: n[multiplicity:'4'] + Fm252 + gamma (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: -16872222.92285156 eV vs -1.72321e7 eV!
31. Calculated and tabulated Q values disagree.
reaction label 13: Fm256 + gamma (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 6744319.142303467 eV vs 6384460. eV!
32. Multiplicity does not match sum of linked product multiplicities!
multiplicitySum label 10: n + (Fm255_c ->Fm255 + gamma) total gamma multiplicity (Error # 0): summedMultiplicityMismatch
- WARNING: Multiplicity does not match sum of linked product multiplicities! Max diff: 14.54%
33. Multiplicity does not match sum of linked product multiplicities!
multiplicitySum label 11: n[multiplicity:'2'] + Fm254 + gamma total gamma multiplicity (Error # 0): summedMultiplicityMismatch
- WARNING: Multiplicity does not match sum of linked product multiplicities! Max diff: 100.00%
34. Multiplicity does not match sum of linked product multiplicities!
multiplicitySum label 12: n[multiplicity:'3'] + Fm253 + gamma total gamma multiplicity (Error # 0): summedMultiplicityMismatch
- WARNING: Multiplicity does not match sum of linked product multiplicities! Max diff: 79.28%
35. Calculated and tabulated Q values disagree.
fissionComponent label 0: /reactionSuite/fissionComponents/fissionComponent[@label='0'] (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 238554706460.2038 eV vs 2.27619e8 eV!
36. Calculated and tabulated Q values disagree.
fissionComponent label 1: /reactionSuite/fissionComponents/fissionComponent[@label='1'] (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 238554706460.2038 eV vs 2.27619e8 eV!
37. Calculated and tabulated Q values disagree.
fissionComponent label 2: /reactionSuite/fissionComponents/fissionComponent[@label='2'] (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 238554706460.2038 eV vs 2.27619e8 eV!
38. Calculated and tabulated Q values disagree.
fissionComponent label 3: /reactionSuite/fissionComponents/fissionComponent[@label='3'] (Error # 0): Q mismatch

```
WARNING: Calculated and tabulated Q-values disagree: 238554706460.2038 eV vs 2.27619e8 eV!
```

39. A covariance matrix was not positive semi-definite, so it has negative eigenvalues.
Section 19 (n + Fm255 [angular distribution]): / Form 'eval': / LegendreLValue L=1 vs 1 (Error # 0): Bad evs

```
WARNING: 11 negative eigenvalues! Worst case = -2.806052e-05
```

- njoy2012 Warnings:

1. Evaluation has no resonance parameters given
unresr...calculation of unresolved resonance cross sections (0): No RR

```
---message from unresr---mat 9936 has no resonance parameters
copy as is to nout
```

2. In some evaluations, the partial fission reactions MT=19, 20, 21, and 38 are given in File 3, but no corresponding distributions are given. In these cases, it is assumed that MT=18 should be used for the fission neutron distributions.
heatr...prompt kerma (0): HEATR/hinit (3)

```
---message from hinit---mt19 has no spectrum
mt18 spectrum will be used.
```

3. Recoil is not given, so one-particle recoil approximation used.
heatr...prompt kerma (1): HEATR/hinit (4)

```
---message from hinit---mf6, mt 16 does not give recoil za=100254
one-particle recoil approx. used.
```

4. Recoil is not given, so one-particle recoil approximation used.
heatr...prompt kerma (2): HEATR/hinit (4)

```
---message from hinit---mf6, mt 17 does not give recoil za=100253
one-particle recoil approx. used.
```

5. Recoil is not given, so one-particle recoil approximation used.
heatr...prompt kerma (3): HEATR/hinit (4)

```
---message from hinit---mf6, mt 17 does not give recoil za=100253
one-particle recoil approx. used.
```

6. Recoil is not given, so one-particle recoil approximation used.
heatr...prompt kerma (4): HEATR/hinit (4)

```
---message from hinit---mf6, mt 51 does not give recoil za=100255
one-particle recoil approx. used.
```

7. Recoil is not given, so one-particle recoil approximation used.
heatr...prompt kerma (5): HEATR/hinit (4)

```
---message from hinit---mf6, mt 52 does not give recoil za=100255
one-particle recoil approx. used.
```

8. Recoil is not given, so one-particle recoil approximation used.
heatr...prompt kerma (6): HEATR/hinit (4)

```
---message from hinit---mf6, mt 53 does not give recoil za=100255
one-particle recoil approx. used.
```

9. Recoil is not given, so one-particle recoil approximation used.
heatr...prompt kerma (7): HEATR/hinit (4)

```
---message from hinit---mf6, mt 54 does not give recoil za=100255
one-particle recoil approx. used.
```

10. Recoil is not given, so one-particle recoil approximation used.
heatr...prompt kerma (8): HEATR/hinit (4)

```
---message from hinit---mf6, mt 55 does not give recoil za=100255
one-particle recoil approx. used.
```

11. Recoil is not given, so one-particle recoil approximation used.
heatr...prompt kerma (9): HEATR/hinit (4)

```
---message from hinit---mf6, mt 56 does not give recoil za=100255
one-particle recoil approx. used.
```

12. Recoil is not given, so one-particle recoil approximation used.
heatr...prompt kerma (10): HEATR/hinit (4)

```
---message from hinit---mf6, mt 57 does not give recoil za=100255
one-particle recoil approx. used.
```

13. Recoil is not given, so one-particle recoil approximation used.
heatr...prompt kerma (11): HEATR/hinit (4)

```
---message from hinit---mf6, mt 91 does not give recoil za=100255
one-particle recoil approx. used.
```

14. Recoil is not given, so one-particle recoil approximation used.
heatr...prompt kerma (12): HEATR/hinit (4)

```
---message from hinit---mf6, mt102 does not give recoil za=100256
photon momentum recoil used.
```

15. There is a problem with the fission energy release.
heatr...prompt kerma (19): HEATR/nheat (3)

```
---message from nheat---changed q from 2.276190E+08 to 2.178830E+08
for mt 18
```

16. Evaluation has no resonance parameters given
purr...probabalistic unresolved calculation (0): No RR

```
---message from purr---mat 9936 has no resonance parameters
copy as is to nout
```

- **xsectplotter** Errors:

1. Duplicate Eout in outgoing distribution
(Error # 2): Bad Eout

```
WARNING: skipping duplicate e_out = 6384470.0, i1 = 121 6 10.0
WARNING: skipping duplicate e_out = 6384480.0, i1 = 121 7 20.0
WARNING: skipping duplicate e_out = 6384490.0, i1 = 121 8 30.0
WARNING: skipping duplicate e_out = 6384510.0, i1 = 121 9 50.0
... plus 2 more instances of this message
```